Track reconstruction
Hadrien Grasland 2024-05-27

Acts core (done) : Geometry

- OpenDataDetector v4.0.1 update brings material handling

- New detector geometry (now referred to as « Gen2 »)
  - Early gen1/2 interop work
  - Simulation and digitization examples got a gen1/2 switch

- Geant4 surface mapper getting ready for ITk and Gen2 geom

- Can simulate and record material from GeoModel (for ITk)

Acts core (done) : Material, Seeding

- Material mapper refactor #3015 #3016 #3020 #3066 #3094 #3096
  - Deduplicated surface/volume material mapping
  - Modularized for testability

- JSON I/O for grid material + detray-style material maps

- Various small seeding optimizations

Acts core (done) : Propagation, Fitting

- Lots of stepper/CKF optimizations
  #2811 #2814 #3125 #3102 #3128 #3130 #3137 #3150 #3172

- Two-way CKF example

- CKF stopped smoothing implicitly

- Global chi² fitter now supports holes

Acts core (done) : Misc

- Port of Athena's score-based ambiguity solver

- Integrated ~all R&D projects into the Acts build system

- ...and, as usual, lots of smaller bug fixes and polish

Acts core (WIP)

- Boundary checks refactor #3170 #3204 #3206 #3207

- Experimental native GeoModel detector support

- More stepper/CKF optimizations #3152 #3198

- Write simulation hits to OBJ files

- First R&D project plug-ins

  - Detray

  - Covfie

algebra-plugins and vecmem

- Algebra-plugins : Mostly SoA and SIMD work
  - SoA layout for vectors
  - Vc-based SIMD transform3
  - WIP explicit vectorization in Vc AoS plugin

- Vecmem
  - More work on AMD HIP support
  - WIP bulk-reserve space in vecmem vector

detray (**done** and **WIP**)

- Reverse propagation/geometry dependency

- Homogeneous material builder + examples

- Clean up ray scan RNG + optimize

- Material map SVG export

- CUDA navigation validation + WIP tool to validate any JSON

- SIMD SoA intersectors

- WIP Explicitly SIMD Vc AoS plugin

traccc (**done**)

- ODD full chain on CPU + experimental CUDA + throughput

- Alpaka now supports AMD HIP + rocThrust

- Per-algorithm timing in full chain reco

- New data files allow using a grid on ODD for a 2-3x speedup

- KF step count aborter

- OBJ export of spacepoints + seeds & track candidates

- Only copy back GPU fitting results to improve throughput

- Basic handling of strip detectors

traccc (WIP)

- ROOT scripts documentation
- Alpaka clustering and throughput measurements
- Deduplicate measurements in greedy solver
- Truth particules & track finding efficiency

IJCLab news

- Calo postdoc opened, some good candidates
  - Some immigration office issues, hopefully not fatal

Thanks for your attention !